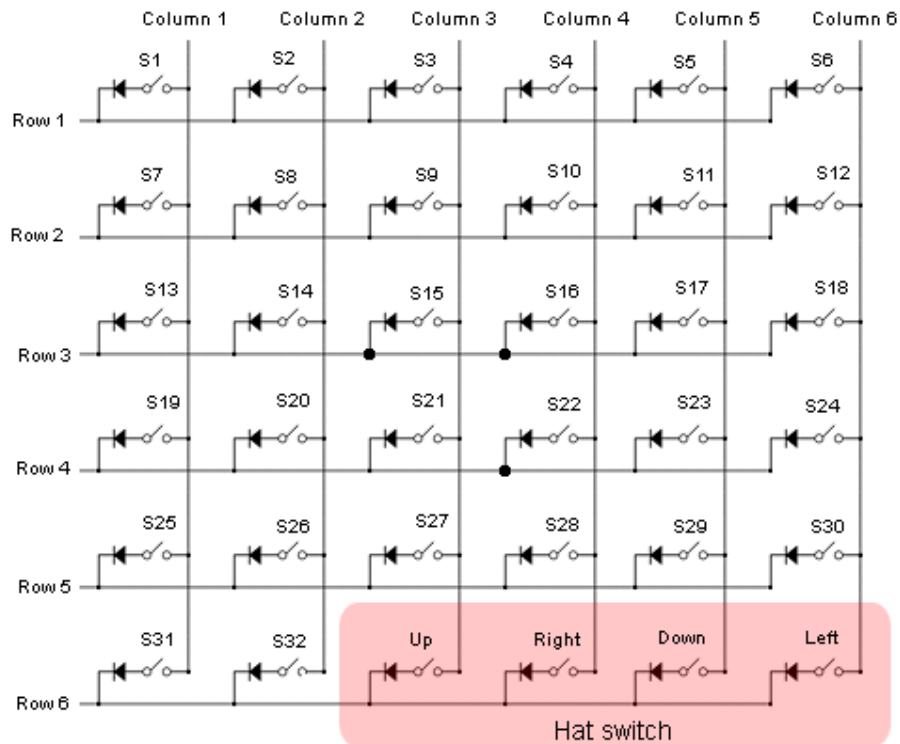**_www.737ng.co.uk_**

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CONNECTING TO THE BU0836 (and BU0836A)
USING A MATRIX

Leo (God Love Him) has uploaded this image to his website to help you connect your buttons and switches to his BU0836 Card.

But, the problem is, we're not all as smart as Leo, so here's a blow by blow explanation which just may help you get your head around hooking up.

If you look at the above image, this is a depiction of a matrix. There are 6 Rows and 6 Columns.   By connecting any row to any column, results in a button press being seen. Here's

a couple of examples…. Connect Row 4 to Column 4 for Button 22, Row 1 to Column 4 for Button 4, Row 3 to Column 5 for 17 and so on. That's the easy bit to understand :o))

If you are using Push Buttons Only, there is no need to use Diodes because obviously only one 'bridge' is being made at any time.

But, if you want to use Toggle Switches or any kind of switch that remains on (including Rotary Encoders), then to prevent loopback and actioning unintended button presses, Diodes must be used in your connections.

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Ok, let's look at the Matrix and help you understand how it works. Again, look at the above image on the top line. You will see Row 1 on the Left Side and the Columns 1-6 along the top.   Now look when you 'bridge' Row 1 and Column 1, the result is Button 1 (S1). Bridge Row 1 and Column 2, Button 2 (S2) is the result. Row 1 to Column 3 = Button 3 (S3) and so on.
Did you notice that only the Column No. is changing? Row 1 to Column 1 thru Column 6 will result in Button 1 to 6 being sent.   It then follows that the Row is obviously the common factor in the group isn't it.

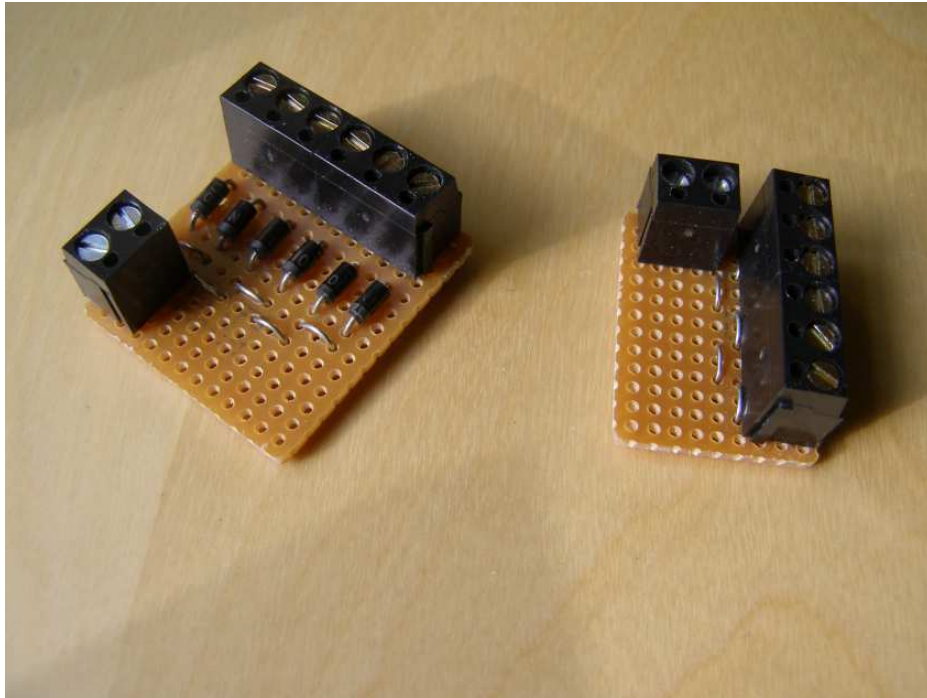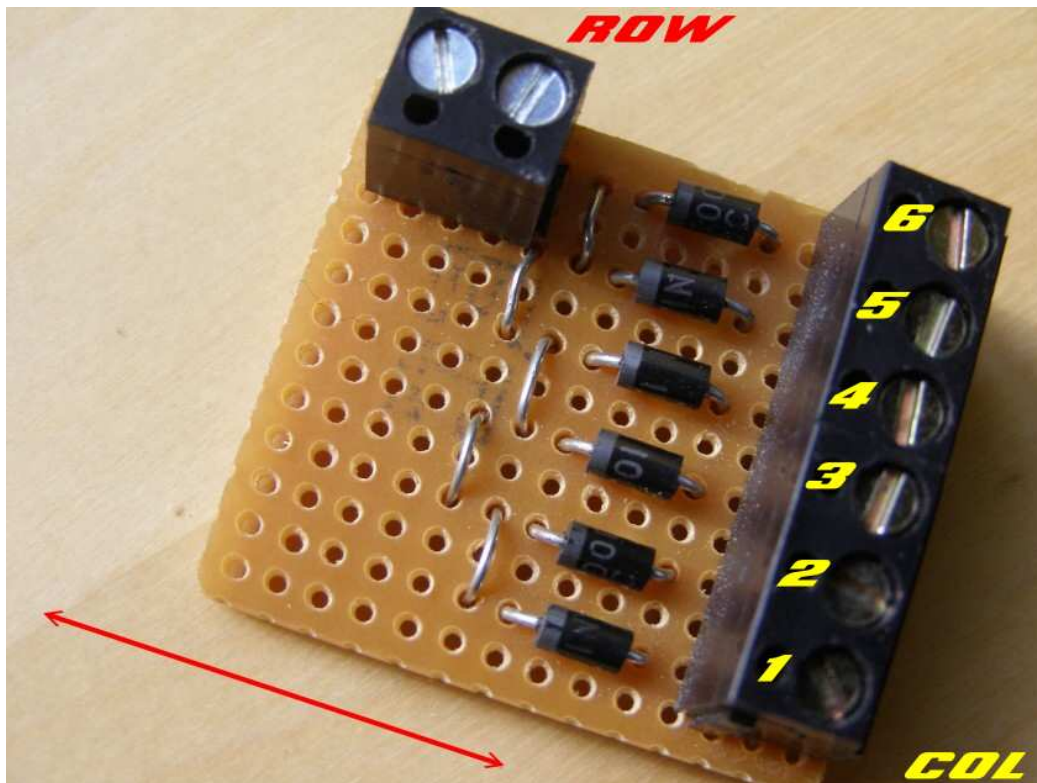|	
Row 1 to Column 1 = Button 1	Row 1 to Column 2 = Button 2
Row 1 to Column 3 = Button 3	Row 1 to Column 4 = Button 4
Row 1 to Column 5 = Button 5	Row 1 to Column 6 = Button 6
Row 2 to Column 1 = Button 7	Row 2 to Column 2 = Button 8
Row 2 to Column 3 = Button 9	Row 2 to Column 4 = Button 10
Row 2 to Column 5 = Button 11	Row 2 to Column 6 = Button 12
Row 3 to Column 1 = Button 13	Row 3 to Column 2 = Button 14
Row 3 to Column 3 = Button 15	Row 3 to Column 4 = Button 16
Row 3 to Column 5 = Button 17	Row 1 to Column 6 = Button 18
Row 4 to Column 1 = Button 19	Row 4 to Column 2 = Button 20
Row 4 to Column 3 = Button 21	Row 4 to Column 4 = Button 22
Row 4 to Column 5 = Button 23	Row 4 to Column 6 = Button 24
Row 5 to Column 1 = Button 25	Row 5 to Column 2 = Button 26
Row 5 to Column 3 = Button 27	Row 5 to Column 4 = Button 28
Row 5 to Column 5 = Button 29	Row 5 to Column 6 = Button 30
Row 6 to Column 1 = Button 31	Row 6 to Column 2 = Button 32

Remember Row 6 to Column 4,5 & 6 are for the Hat switch, so I haven't included them here.

Examples of a Matrix

These are simple Matrix Boards. Easy, cheap and quick to make. Made on Stripboard. The copper strips run in the direction of the arrows.

This example is fitted with diodes. That means it can be used with any type of switch that can give a permanently ON state. Toggle Switch, Rotary Switch, Rotary Encoder etc.

Let me tell you how it works.   Look at Leo's diagram and remember that we have to connect the six Columns to a Row to get 6 consecutive Buttons (1 to 6,13 to 18, 25 to 30 etc). Now look at the diagram again. See where the diodes are and which way they conduct. In simple terms you connect the column to the row through a diode and the diode always faces the row.

Now look at the matrix board above. See which way the diodes are pointing. So obviously the 6 terminal block would be the 6 columns inputs from the switches and either contact on the double terminal block on the top would go to a row.

Each column input to the matrix board has it's own copper strip. Diodes are soldered to the strip and then the strip is cut under the diode (or the diode would be of no use). Then all the strips are bridged together (behind the diodes) with link wires and the Row connector is soldered to one of the strips.

The result is that you can input from any column to the row without compromising the state of any other of the inputs.

In a nutshell, connect the row to the matrix at the connector. Then run the 6 column wires from the card to your switch and then to the column input on the matrix board.
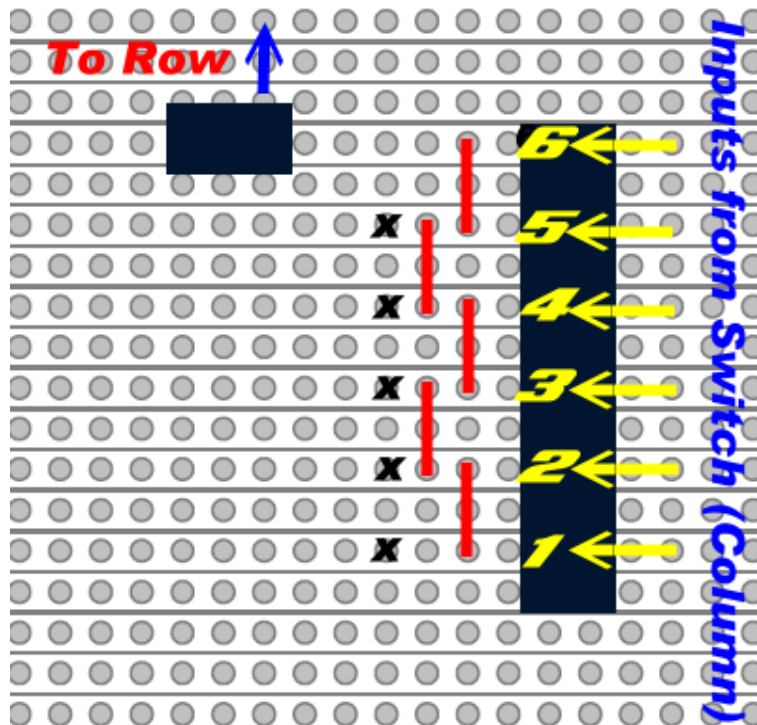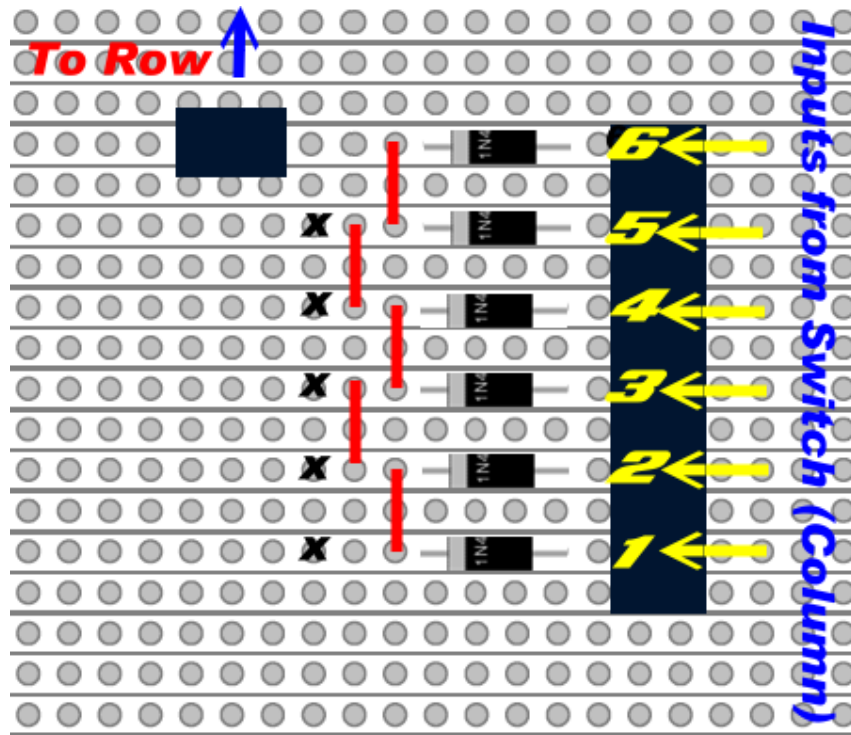
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This is a much simpler example. Note there are no diodes. This matrix board is intended for use with switches which are momentary ON or push buttons. Switches that do not have a permanently ON state do not need to have diodes fitted in the circuit.

Works exactly the same as the first example except without the diodes. Because momentary and push switches are normally open, closing one (turning it on) does not affect any of the other switches because they are open (off).
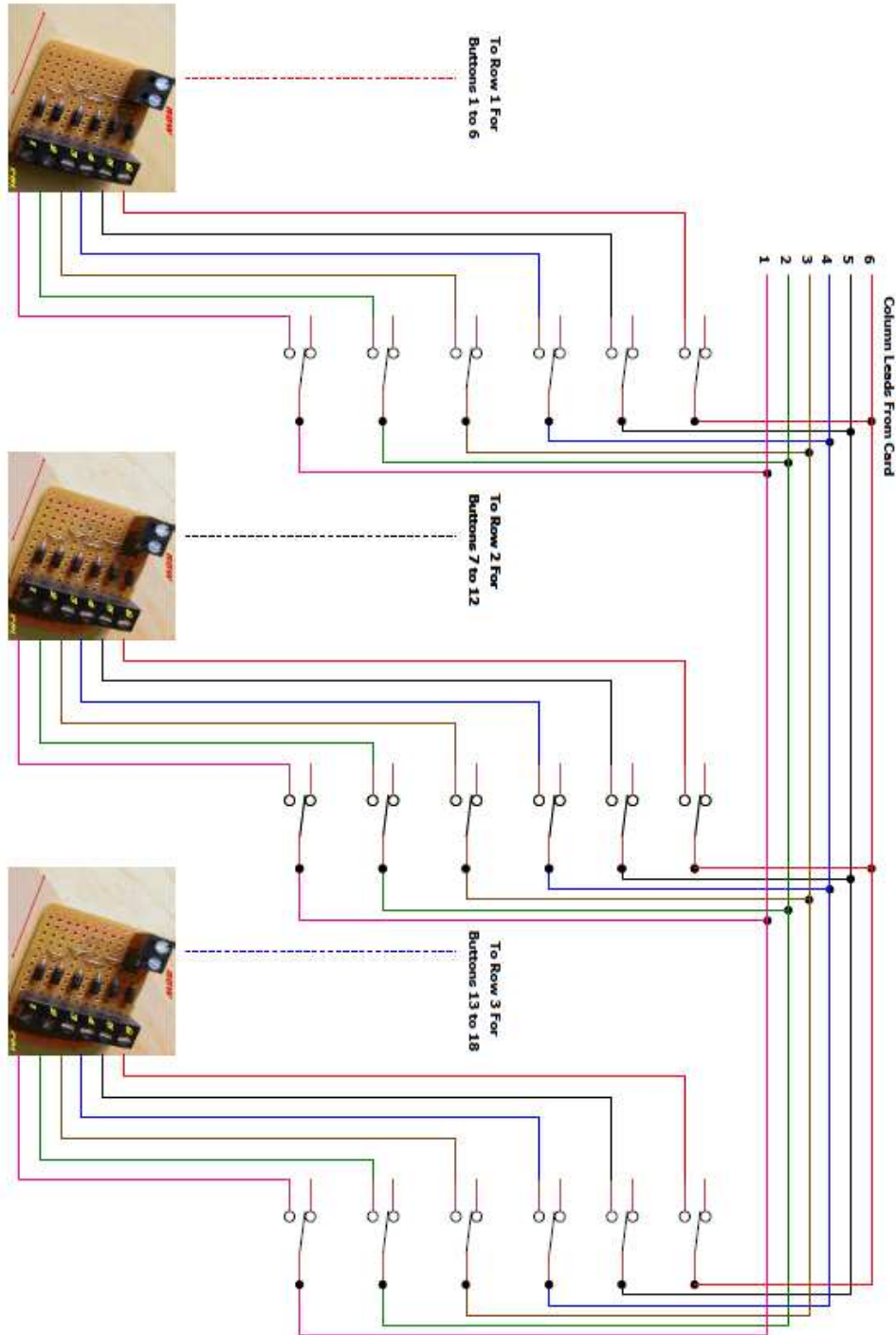
So connect the Row to the terminal block on the board. Connect the 6 columns on the card to the switches and then return from the switches to the inputs on the matrix board.

Here's a couple of diagrams showing the Matrix on Stripboard.   You have to cut the copper strip where you see the X and also remember to cut the strip between the two ends of the diode.

These are simple 6 button/switch matrix boards which is usually what I make. It means I can hide them away (cable tied to wiring).   And it allows me to have switches spread out in different location in the cockpit without having a bunch of wires all congregating in one place. But if you are feeling adventurous, there's no reason why you cant build several onto a piece of stripboard. Just remember to isolate each 6 input matrix by cutting the strip between them.

Multiple Groups

BUTTON NUMBERING, WINDOWS vs FSUIPC.

Just a point that has cropped up quite a lot recently. Once you have all your buttons and switches all hooked up and working, Windows will see them as Button 1 to 32. However if you are using FSUIPC to assign your buttons and switches, please remember that FSUIPC sees the inputs as 0 to 31.

It then follows that the button numbering between the two regimes is one out.   So, what you think is button 8 will be returned in FSUIPC as 7 and button 32 will be returned by FSUIPC as 31.   No worries as long as you remember that.

Hope that helped you out and gave you some ideas.   And comments always welcome, even if you think the idea is crap :o)) That way I get to improve things ……

Thanks for your interest and good luck…..

Ian

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